

MEMORANDUM (LABORATORY DATA REPORT)

Shaw Environmental and Infrastructure, Inc.
Contract No. EP-C-08-034

In reply refer to: 10-LH-66

To: Cindy Paul
Dennis Miller

From: Lisa Hudson

Lab: GC

Thru: Sujith Kumar
John Cox

Date: 10/25/10

Technical Directive No.: 7OA677DW
Task No.: 23993

Originator: Rick Wilkin
Copies: Rick Wilkin
Lisa Hudson
John Cox

Project/Sample Site: Pavillion Groundwater
Date Collected: 10/5-7/10
Date Received: 10/8/10
Date Analyzed: 10/14/10
No. Samples Analyzed: 17

Shaw Sample Set No.: 5763
Sample Matrix: Water
Analysis Type: Dissolved Gas
Sample Preparation: Not applicable

Method(s) Used : RSKSOP-194 rev4 Gas Analysis by Micro Gas Chromatograph
RSKSOP-175 rev5 Sample Preparation and Calculations for Dissolved Gas
Analysis in Water Samples Using a GC Headspace Equilibration Technique

Comments: All QC results met criteria established in RSKSOP-194, and RSKSOP-175.

Note: Samples 5763-1, 4-9, 14-17 had negative pressure after creation of the headspace and equilibration per the SOP 3 mLs of Diluent gas (argon) was added. The negative pressure measurement noted above is likely due to the high solubility of argon in water.

Shaw Environmental and Infrastructure, Inc.

Analytical Service Results Report

Laboratory: GC Report Date: 10/25/10

Technical Directive: 70A677DW

Analyst: Lisa Hudson

Method: RSKSOP-175 & RSKSOP-194			Analytes				Methane				Carbon Dioxide	
			Codes				74-82-8				124-38-9	
			Unit				µg/L, in water				µg/L, in water	
Lab Sample ID	Date Collected	Date Analyzed	Field Sample ID	MDL	QL	Data	DF	MDL	QL	Data	DF	
5763-1	10/5/10	10/14/10	RD01 (P)	0.0758	1.33	762	1	70.3	243	ND	1	
5763-2	10/6/10	10/14/10	EPAMW01 (P)	0.0809	1.42	19,090	1	75.1	259	ND	1	
5763-3	10/6/10	10/14/10	EPAMW02 (P)	0.102	1.78	22,590	1	94.2	325	ND	1	
5763-4	10/6/10	10/14/10	LD01 (P)	0.0746	1.31	189	1	69.0	238	ND	1	
5763-5	10/6/10	10/14/10	LD01 (Dup) (P)	0.0747	1.31	168	1	69.1	238	ND	1	
5763-6	10/5/10	10/14/10	RD01 Field Blank (F)	0.0950	1.67	76.4	1	87.9	303	ND	1	
5763-7	10/6/10	10/14/10	Trip Blank	0.0810	1.42	23.3	1	75.0	258	ND	1	
5763-8	10/7/10	10/14/10	EQBLK (P)	0.0963	1.69	23.0	1	90.0	311	ND	1	
5763-9	10/7/10	10/14/10	LD02 (P)	0.0760	1.33	229	1	71.0	245	ND	1	
5763-11	10/5/10	10/14/10	RD01 (U)	0.0755	1.33	741	1	70.4	243	BQL(127)	1	
5763-12	10/6/10	10/14/10	EPAMW01 (P) (Dup)	0.0901	1.58	12,280	1	84.0	290	ND	1	
5763-13	10/6/10	10/14/10	EPAMW02 (P) (Dup)	0.0849	1.49	20,740	1	79.3	273	ND	1	
5763-14	10/6/10	10/14/10	LD01 (U)	0.0748	1.32	453	1	69.8	241	BQL(201)	1	
5763-15	10/6/10	10/14/10	LD01 (Dup) (U)	0.0972	1.71	75.9	1	90.8	313	BQL(197)	1	
5763-15 Lab Dup	10/6/10	10/14/10	LD01 (Dup) (U)	0.0972	1.71	75.2 (RPD=0.927)	1	90.8	313	BQL(216) (RPD=NA)	1	
5763-16	10/5/10	10/14/10	RD01 Field Blank (UF)	0.0731	1.28	16.6	1	68.1	235	395	1	
5763-17	10/7/10	10/14/10	EQBLK (U)	0.0738	1.30	9.79	1	50.8	237	496	1	
5763-18	10/7/10	10/14/10	LD02 (U)	0.0765	1.34	200	1	71.3	246	ND	1	

Comments:

The data quality objectives (DQO) of RSKSOP-194/4 have been met. The MDL's and QL's reported represent those completed January 19 and April 19, 2010. P=Preserved, U=Unpreserved, F=Filtered, UF=Unfiltered

Notes:

1. If the parameter was detected above the quantitation limit (**QL**), the numeric result is reported; **BQL** denotes that the parameter was not detected at or above the quantitation limit; **BQL ()** denotes that the parameter was detected above the method detection limit (**MDL**) but below **QL** and the estimated numeric result is reported in parenthesis; **ND** denotes that the parameter was not detected at all. All the results are corrected with dilution factors (**DF**), if applicable.

2. " - " denotes that the information is not available or the analyte is not analyzed.

Shaw Environmental and Infrastructure, Inc.

Analytical Service Results Report

Laboratory: GC Report Date: 10/25/10

Technical Directive: 70A677DW

Analyst: Lisa Hudson

Method: RSKSOP-175 & RSKSOP-194			Analytes			Ethane		Acetylene			
			Codes			74-84-0		74-86-2			
			Unit			µg/L, in water		µg/L, in water			
Lab Sample ID	Date Collected	Date Analyzed	Field Sample ID	MDL	QL	Data	DF	MDL	QL	Data	DF
5763-1	10/5/10	10/14/10	RD01 (P)	0.189	2.70	ND	1	1.98	17.0	ND	1
5763-2	10/6/10	10/14/10	EPAMW01 (P)	0.202	2.89	2,230	1	2.11	18.2	ND	1
5763-3	10/6/10	10/14/10	EPAMW02 (P)	0.253	3.62	3,290	1	2.65	22.8	ND	1
5763-4	10/6/10	10/14/10	LD01 (P)	0.186	2.66	24.3	1	1.94	16.7	ND	1
5763-5	10/6/10	10/14/10	LD01 (Dup) (P)	0.186	2.66	17.4	1	1.94	16.7	ND	1
5763-6	10/5/10	10/14/10	RD01 Field Blank (F)	0.236	3.39	15.1	1	2.47	21.3	ND	1
5763-7	10/6/10	10/14/10	Trip Blank	0.202	2.89	6.20	1	2.11	18.2	ND	1
5763-8	10/7/10	10/14/10	EQBLK (P)	0.240	3.44	BQL(6.08)	1	2.52	21.7	ND	1
5763-9	10/7/10	10/14/10	LD02 (P)	0.189	2.71	21.1	1	1.99	17.1	ND	1
5763-11	10/5/10	10/14/10	RD01 (U)	0.188	2.70	BQL(3.73)	1	1.97	17.0	ND	1
5763-12	10/6/10	10/14/10	EPAMW01 (P) (Dup)	0.225	3.22	1,510	1	2.36	20.3	ND	1
5763-13	10/6/10	10/14/10	EPAMW02 (P) (Dup)	0.212	3.03	2,750	1	2.22	19.2	ND	1
5763-14	10/6/10	10/14/10	LD01 (U)	0.187	2.67	63.4	1	1.96	16.9	ND	1
5763-15	10/6/10	10/14/10	LD01 (Dup) (U)	0.242	3.47	9.86	1	2.55	21.9	ND	1
5763-15 Lab Dup	10/6/10	10/14/10	LD01 (Dup) (U)	0.242	3.47	9.72 (RPD=1.43)	1	2.55	21.9	ND (RPD=NA)	1
5763-16	10/5/10	10/14/10	RD01 Field Blank (UF)	0.182	2.61	4.60	1	1.91	16.5	ND	1
5763-17	10/7/10	10/14/10	EQBLK (U)	0.184	2.63	BQL(3.66)	1	1.93	16.6	ND	1
5763-18	10/7/10	10/14/10	LD02 (U)	0.191	2.73	18.5	1	2.00	17.2	ND	1

Comments:

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Analytical Service Results Report

Laboratory: GC Report Date: 10/25/10

Technical Directive: 70A677DW

Analyst: Lisa Hudson

Method: RSKSOP-175 & RSKSOP-194			Analytes			Propane		Butane			
			Codes			74-98-6		106-97-8			
			Unit			µg/L, in water		µg/L, in water			
Lab Sample ID	Date Collected	Date Analyzed	Field Sample ID	MDL	QL	Data	DF	MDL	QL	Data	DF
5763-1	10/5/10	10/14/10	RD01 (P)	0.226	3.75	ND	1	0.209	4.71	ND	1
5763-2	10/6/10	10/14/10	EPAMW01 (P)	0.241	4.00	790	1	0.223	5.03	158	1
5763-3	10/6/10	10/14/10	EPAMW02 (P)	0.303	5.02	1,820	1	0.280	6.31	355	1
5763-4	10/6/10	10/14/10	LD01 (P)	0.222	3.68	ND	1	0.206	4.63	ND	1
5763-5	10/6/10	10/14/10	LD01 (Dup) (P)	0.223	3.69	ND	1	0.206	4.64	ND	1
5763-6	10/5/10	10/14/10	RD01 Field Blank (F)	0.283	4.69	ND	1	0.262	5.90	ND	1
5763-7	10/6/10	10/14/10	Trip Blank	0.241	4.00	ND	1	0.223	5.03	ND	1
5763-8	10/7/10	10/14/10	EQBLK (P)	0.288	4.77	ND	1	0.266	5.99	ND	1
5763-9	10/7/10	10/14/10	LD02 (P)	0.227	3.76	ND	1	0.210	4.73	ND	1
5763-11	10/5/10	10/14/10	RD01 (U)	0.225	3.74	ND	1	0.208	4.70	ND	1
5763-12	10/6/10	10/14/10	EPAMW01 (P) (Dup)	0.269	4.46	636	1	0.249	5.60	93.8	1
5763-13	10/6/10	10/14/10	EPAMW02 (P) (Dup)	0.253	4.20	1,480	1	0.235	5.28	282	1
5763-14	10/6/10	10/14/10	LD01 (U)	0.223	3.70	267	1	0.207	4.65	BQL(2.55)	1
5763-15	10/6/10	10/14/10	LD01 (Dup) (U)	0.290	4.81	ND	1	0.268	6.05	ND	1
5763-15 Lab Dup	10/6/10	10/14/10	LD01 (Dup) (U)	0.290	4.81	ND (RPD=NA)	1	0.268	6.05	ND (RPD=NA)	1
5763-16	10/5/10	10/14/10	RD01 Field Blank (UF)	0.218	3.61	ND	1	0.202	4.54	ND	1
5763-17	10/7/10	10/14/10	EQBLK (U)	0.220	3.65	ND	1	0.190	4.59	ND	1
5763-18	10/7/10	10/14/10	LD02 (U)	0.228	3.78	ND	1	0.211	4.76	ND	1

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Analytical Service Results Report

Laboratory:

GC

Report Date:

10/25/10

Technical Directive:

70A677DW

Analyst:

Lisa Hudson

			QC Sample ID		Argon Blank			Refinery Gas		
			Additional ID		MB			CCC		
			Date Prepared		10/14/10			5/13/10		
			Date Analyzed		10/14/10			10/14/10		
Analytes		Unit	MDL	QL	Data	True Values	% Rec.	Data	True Values	% Rec.
Names	CAS #									
Methane	74-82-8	ppm	0.569	10.0	ND	-	-	49500	50080	98.8
Carbon Dioxide	124-38-9	ppm	29.0	100	ND	-	-	31400	30030	105
Ethane	74-84-0	ppm	0.698	10.0	ND	-	-	40400	40120	101
Acetylene	74-86-2	ppm	1.16	10.0	ND	-	-	10400	10000	104
Propane	74-98-6	ppm	0.603	10.0	ND	-	-	59600	60150	99.1
n-Butane	106-97-8	ppm	0.444	10.0	ND	-	-	44700	40220	111
dilution factor	-	-	-	-	-	1	-	-	1	-

Comments:

The data quality objectives (DQO) of RSKSOP-194 have been met. The MDL's and QL's reported represent those completed on January 19, 2010 and April 19, 2010. *Estimated values.

Notes:

1. **MB** - Method Blank. **CCC** - Continuing Calibration Check. A calibration standard analyzed within the batch of samples. **LCS** - Laboratory Control Spike. A laboratory blank spiked with analytes at known concentrations. **MS** - Matrix Spike. A field sample spiked with known concentrations of analytes. The field sample id is identified. **SS** - Samples obtained from a second source. **DUP** - Field sample duplicate analysis. A sample selected by the lab analyst to analyze as a duplicate. It is reported in the sample result section. **% REC** - Percent Recovery. Calculated as the percentage of the results to the true values. It equals to % accuracy for CCC.

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Analytical Service Results Report

Laboratory:

GC

Report Date:

10/25/10

Technical Directive:

70A677DW

Analyst:

Lisa Hudson

Analyst: <div>Lisa Hudson</div>			QC Sample ID		Refinery Gas			Argon Blank		
			Additional ID		SS			MB		
			Date Prepared		7/8/10			10/14/10		
			Date Analyzed		10/14/10			10/14/10		
Analytes		Unit	MDL	QL	Data	True Values	% Rec.	Data	True Values	% Rec.
Names	CAS #									
Methane	74-82-8	ppm	0.569	10.0	49200	50080	98.2	ND	-	-
Carbon Dioxide	124-38-9	ppm	29.0	100	31500	30030	105	ND	-	-
Ethane	74-84-0	ppm	0.698	10.0	40900	40120	102	ND	-	-
Acetylene	74-86-2	ppm	1.16	10.0	9170	10000	91.7	ND	-	-
Propane	74-98-6	ppm	0.603	10.0	59900	60150	99.6	ND	-	-
n-Butane	106-97-8	ppm	0.444	10.0	45300	40220	113	ND	-	-
dilution factor	-	-	-	-	-	1	-	-	1	-

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70A677DW

Analyst:

Lisa Hudson

Analyst: <div>Lisa Hudson</div>			QC Sample ID		Refinery Gas			Argon Blank		
			Additional ID		CCC			MB		
			Date Prepared		5/13/10			10/14/10		
			Date Analyzed		10/14/10			10/14/10		
Analytes		Unit	MDL	QL	Data	True Values	% Rec.	Data	True Values	% Rec.
Names	CAS #									
Methane	74-82-8	ppm	0.569	10.0	48800	50080	97.4	ND	-	-
Carbon Dioxide	124-38-9	ppm	29.0	100	31300	30030	104	ND	-	-
Ethane	74-84-0	ppm	0.698	10.0	40400	40120	101	ND	-	-
Acetylene	74-86-2	ppm	1.16	10.0	11000	10000	110	ND	-	-
Propane	74-98-6	ppm	0.603	10.0	59000	60150	98.1	ND	-	-
n-Butane	106-97-8	ppm	0.444	10.0	44900	40220	112	ND	-	-
dilution factor	-	-	-	-	-	1	-	-	1	-

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10/25/10

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70A677DW

Analyst:

Lisa Hudson

QC Sample ID		Refinery Gas			500000			Argon Blank		
Additional ID		CCC			CCC			MB		
Date Prepared		5/13/10			3/1/10			10/14/10		
Date Analyzed		10/14/10			10/14/10			10/14/10		
MDL	QL	Data	True Values	% Rec.	Data	True Values	% Rec.	Data	True Values	% Rec.
0.569	10.0	48400	50080	96.6	481000	502000	95.8	ND	-	-
29.0	100	31800	30030	106	496000	480000	103	ND	-	-
0.698	10.0	40900	40120	102	ND	-	-	ND	-	-
1.16	10.0	11200	10000	112	ND	-	-	ND	-	-
0.603	10.0	60000	60150	99.8	ND	-	-	ND	-	-
0.444	10.0	45800	40220	114	ND	-	-	ND	-	-
-	-	-	1	-	-	1	-	-	1	-

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